BHARATHIDASAN UNIVERSITY, TIRUCHIRAPPALLI – 620 024.

Master of Computer Application - Course Structure under CBCS

(applicable to the candidates admitted from the academic year 2010-2011 onwards)

Eligibility: A candidate who is a graduate in Mathematics or Physics or Chemistry or Statistics or Computer Science or Industrial Electronics or Applied Science (with mathematics as an allied subject / major subject) or B.com. or B.B.A or B.E./B.Tech (except Computer Science Engineering Brach) / AMIE of this University or from a recognized University or a examination accepted by the syndicate as equivalent thereto

Lateral entry: PGDCA OR B.Sc. Computer Science OR B.Sc. Information Technology OR BCA

Semester	Course	Course Title	Ins. Hrs / Week	Credit	Exam Hrs	Marks		Total
						Int.	Extn.	
I	Core Course – I (CC)	Digital Electronics and Computer Organization	5	4	3	25	75	100
	Core Course – II (CC)	Data Structures and Algorithms	5	4	3	25	75	100
	Core Course – III (CC)	Operating Systems	5	4	3	25	75	100
	Core Course – IV (CC)	C Programming	4	4	3	25	75	100
	Core Course – V (CC)	Organizational Behavior	5	4	3	25	75	100
	Core Course – VI (CC)	C programming Lab (Data Structures)	3	1.5	3	40	60	100
	Core Course – VII (CC)	Office Automation Lab	3	1.5	3	40	60	100
		Total	**30**	**23**				**700**
II	Core Course – VIII (CC)	Database Systems	5	4	3	25	75	100
	Core Course – IX (CC)	C++ Programming	5	5	3	25	75	100
	Core Course – X (CC)	Discrete Mathematics	5	5	3	25	75	100
	Core Course – XI (CC)	Accounting and Financial Management	5	4	3	25	75	100
	Core Course – XII (CC)	C++ Programming Lab	3	1.5	3	40	60	100
	Core Course – XIII (CC)	OS Lab	3	1.5	3	40	60	100
	Skill Based Course I	Soft Skills Development	-	2	-	-	100	100
	Elective - I	Any one from the given list	4	4	3	25	75	100
		Total	**30**	**27**				**800**
III	Core Course -XIV	Computer Networks	5	4	3	25	75	100
	Core Course –XV	Programming in Java	5	4	3	25	75	100
	Core Course – XVI	Design & Analysis of Algorithms	5	5	3	25	75	100
	Core Course – XVII	Probability and Statistics	5	4	3	25	75	100
	Core Course – XVIII	J2SE Technology Lab	3	1.5	3	40	60	100
	Core Course –XIX	RDBMS Lab	3	1.5	3	40	60	100
	Elective Course II		4	4	3	25	75	100
	Professional Skills – I Practical/Hands-on	System Assembling and Troubleshooting *	-	2		100	N/A	100
		Total	**30**	**23**				**700**

IV	Core Course – XX	Web Technologies	5	4	3	25	75	100
	Core Course – XXI	Distributed Technologies	4	4	3	25	75	100
	Core Course – XXII	Data Mining and Data Warehousing	5	4	3	25	75	100
	Core Course – XXIII	Optimization Techniques	4	4	3	25	75	100
	Core Course – XXIV	Distributed Technologies Lab	4	1.5	3	40	60	100
	Core Course – XXV	Web Technologies Lab	4	1.5	3	40	60	100
	Elective Course III	Any one from the given list	4	5	3	25	75	100
	Skill Based Course II (Viva only)	Soft Skills Management	-	2	-	-		100
		Total	**30**	**26**				**900**
V	Core Course – XXVI	Software Project Management	4	4	3	25	75	100
	Core Course – XXVII	Network Security	5	4	3	4	4	100
	Core Course –XXVIII	Compiler Design	5	4	3	25	75	100
	Core Course – XXIX	Frame Work Lab (Ruby & Media)	4	1.5	3	40	60	100
	Core Course – XXX	Network Security Lab	4	1.5	3	40	60	100
	Core Course – XXXI (Summer Internship)	Industrial Literacy	-	2	-	100	-	100
	Elective IV	Any one from the given list	4	4	3	25	75	100
	Elective V	Any one from the given list	4	4	3	25	75	100
VI	Major Project	Dissertation=80 Marks [2 reviews –20+20=40 marks Report Valuation = 40 marks] Viva = 20 Marks	30	16	-	-	-	100
		Total	**30**	**29**				**700**

Eligibility: Any Degree (with Mathematics or Statisitics at +2 level / as an allied subject / major at an degree level)

PGDCA/BCA/B.Sc.IT/B.Sc.CS candidates are admitted directly in the II year of the MCA programme (Lateral entry)

NOTE:

* Professional Skills Course is introduced in 3rd Semester. There is no definite hours allotted for this course. This course is intended for the candidate to get exposed to the newer technologies other than the class room teaching or other than from syllabus. This course will make a student a 360 degree well-rounded and self-reliant professional in Information Technology.

** A complete Report on the Industry in which the candidate underwent the internship before the beginning of the fifth semester. The report technically includes Organizational Chart, Product manufactured, production planning, prototype used, software used, methodology implemented, future roadmap etc…

ADDITIONAL GUIDELINES FOR THE CURRICULUM:

1. Skill based courses must be given at the end of II and IV semesters. The List of courses to be chosen by the students are listed below.

Recommended Areas:

- ✓ English for competitive examinations/Business Communication
- ✓ Soft Skills Development

There is no definite class-hour allotted for this course. There will be a viva voce examination against a report produced by the student. These courses will be conducted internally by the Institution by arranging workshops, seminars and camps. The Institutes may approach Bharathidasan University Technology Park (BUTP) for any such programmes.

2. Internship must be given at the end of IV semester. The student must produce a report at the first day of the fifth semester. Viva voce examination will be conducted to evaluate the report, internally by the Head of the Department. The marks (Maximum 100) will be awarded and be communicated to the University at the end of 5th Semester along with other results. A viva-voce exam will be conducted along with 5th Semester only. This is purely internal. No theory or practical exams for this course.

3. Professional Skills Course is introduced in 3rd Semester. There is no definite hours allotted for this course. This course is intended for the candidate to become a well-rounded professional including hardware assembly, trouble-shooting, Configuration management, maintenance, installation of tools and packages, networking, system administration etc. This course does not have theory exam. It is purely practical/hands-on oriented. The examination is purely internal to be conducted by the Head of the Department. The marks (Maximum 100) will be awarded and be communicated to the University.

Recommended Credits Distribution: (Total should not be less than 140 Credits)

Course Type	Course	Credits	Total Credits
Core (Theory)	20	4 to 5	82
Core (Practical)	10	1.5	15
Core (Project)	1	10	9
Elective	5	4 to 5	24
Internship	1	2	2
Skill based courses	2	2	4
Professional Skills	2	2	4

ELECTIVE COURSES STARTING FROM SEMESTER II ONWARDS:

Electives – I

1. OOAD & UML
2. Distributed Operating System
3. System Analysis and Design

Electives -II

1. Middleware Technologies
2. Pervasive Computing
3. Enterprise Resource Planning
4. Principles of Programming Languages

Elective – III

1. Parallel Processing
2. e-Commerce
3. Software Engineering
4. RFID

Electives – IV

1. Grid Computing
2. Software Quality Assurance and Testing
3. Soft Computing
4. Pattern Recognition
5. Robotics

Electives - V

1. Mobile Communications
2. Web Services
3. Management Information Systems
4. Computer Graphics
5. Business Intelligence
6. Ontology and Semantic Web

Note:

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Recommended Areas:

- ✓ English for competitive examinations/Business Communication
- ✓ Soft Skills Development

There will be a viva voce examination against a report produced by the student.

2. Internship must be given at the end of IV semester. The student must produce a report at the first day of the fifth semester. Viva voce examination will be conducted to evaluate the report, internally by the Head of the Department. The marks (**Maximum 100**) will be awarded and communicated to the University at the end of **5th** Semester along with other results

Core Course I
Digital Electronics and Computer Organization

Unit I

Number Systems: Decimal, Binary, Octal and Hexadecimal number systems- Conversion between number systems- Binary arithmetic-BCD codes – BCD addition- Alphanumeric codes. Boolean Algebra and logic gates : AND, OR, NOT, NAND, NOR, XOR and X
NOR gates- Truth tables- Basic laws of Boolean Algebra – De-Morgan's theorems.

Unit II

Simplifications of Boolean expressions- Canonical SOP and POS forms- Karnaugh maps- Implementing Boolean expressions using NAND gates alone- Implementing Boolean expressions using NOR gates alone.
Combinational logic circuits: Half and Full adders- Half and Full subtractors- Parallel binary adder- BCD adder- Encoders- Decoders- Multiplexers- Demultiplexers.

Unit III

Sequential logic circuits: NAND latch – SR flip-flop- JK flip-flop – Edge triggering- PRESET and CLEAR inputs – Shift register- Universal shift register- Asynchronous and Synchronous counters – BCD counter.

Unit IV

Parallel Computer Models: Introduction - Flynn's Classifications - Parallel & Vector Computer System - Attributes to performance - implicit and explicit parallelism - shared memory – multiprocessors – Uniform and Non-Uniform Memory Access and Cache only Memory Access Models – Distributed Memory Multicomputers – Multivector & SIMD Computers – PRAM and VLSI Module

UNIT- V

Processors and Memory Hierarchy: CISC & RISC Architectures – CISC Family – RISC Scalar processors – Super Scalar Processors and their features – Very Long Instruction word Architecture vector & symbolic processors , Memory hierarchy

TEXT BOOK(S)

1. Thomas Bartee C, Digital Computer Fundamentals, TMH, 3rd Edition
2. Moris Mano, Computer Architecture and Logic Design, TMH Publications
3. Malvino and Brown, Digital Computer Electronics, TMH, III rd Edition

REFERENCE(S)

1. Malvino and Leech " Digital Principles and Applications" , TMH
2. Liu and Gibson " Microcomputer Systems" PHI

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Core Course II - Data Structures and Algorithms

Unit I

Introduction to data structures, Records, Arrays, Stacks, Queues, Recursion, Linked list, Binary tree and traversing.

Unit II

Sorting and Searching Techniques: Introduction, Internal and External Sorting, Insertion, Selection, Merging, Radix, Quick sort, Heap sort and Bubble sort. Searching: Introduction, Sequential search, Binary search, Binary Tree search.

Unit III

Graphs and Their applications: Introduction, Graph Theory, Terminology, Representation of graphs, Tree & Binary tree, operations on graphs, shortest path Algorithms, Topological sorting.

Unit IV

Algorithms, Development of Algorithms, basic concepts, Structured Program Concepts, Top down development of algorithms, Principle of analyzing Algorithms, Algorithms design methods, Sub goals, Hill climbing.

Unit V

Algorithms Design Techniques: Divide and Conquer algorithms, Dynamic Programming, Greedy algorithms, Backtracking and Branch & bound.

Text Books

1. Seymour Lipschitz "Data Structures, Tata McGraw-Hill
2. Ellis Horowitz & S. Sahni, Fundamentals of Data Structures, Galgotia Pub.

References

Data Structures Using C - Langsam, Augenstien, Tenenbaum, PHI

1. Data structures and Algorithms, V.Aho, Hopcropft, Ullman , LPE
2. Introduction to design and Analysis of Algorithms - S.E. Goodman, ST. Hedetniem- TMH

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Core Course III -Operating Systems

Unit I

Operating Systems Objectives and functions – Operating System and User /Computer Interface, Operating System as a Resource Manager: Evaluation of OperatingSystems – Serial Processing, Sample Batch Systems, Time Sharing Systems.

Unit II

Process Description, Process Control –Processes and Threads. Concurrency – Principles of Concurrency, Mutual Exclusion – Software support, Dekker's Algorithm – Mutual Exclusion – Hardware support, Mutual Messages – Deadlock – Deadlock prevention, Deadlock Detection, Deadlock Avoidance – An Integrated deadlock Strategy.

Unit III

Memory Management – Memory Management Requirements – Fixed Partationing, Placement Algorithm, Relocation in a Paging System – Sample Segmentation. Virtual Memory – Paging – Address Translation in a Paging System. Segmentation – Organization, Address Translation in a Segmentation System – Combined Paging and Segmentation – Virtual Memory – Operating System Software – Fetch Policy, Placement Policy and replacement Policy, Page buffering resident set Management.

Unit IV

Scheduling – Types of Scheduling, scheduling Algorithms, scheduling criteria, FIFO, Round Robin, Shortest Process next, Shortest Remaining Time, Highest response ratio and Feedback scheduling Performance comparison – Fair – Share Scheduling. I/O Management and disk scheduling – Organization of the I/O function – the Evaluation of the I/O function, Logical structure of the I/O function, I/O Buffering, Disk Cache.

Unit V

File Management – Files, File Management Systems, File System Architecture, Functions of File Management File Directories – File Sharing – Secondary Storage Management – File allocation.

Text Books

1. William Stallings, "Operating Systems", Second edition, Maxwell McMillan, International Editions, 1997.
2. Charles Crowley, "Operating Systems-A Design Oriented Approach", IRWIN Publications Chicago, 1997.

References

1. Dental H.M. "An Introduction to Operating Systems", Addison Wesley Publishing Co., 1998.
2. Silberchatz A., Peterson J.L., Galvan P. "Operating System Concepts", Third Edition, Addison Wesley Publishing Co., 1992.

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Core Course IV

C Programming

Unit I

C- Language fundamentals: Program Structure - Identifiers - Data types - Integer - float - double - char - constants - variables - operators and expressions - managing input and output operations.

Unit II

C control structures: Decision making with IF statement - IF.....ELSE statement - nested IF... .ELSE statement - FOR statement - DO.....WHILE statement - WHILE.....DO statement - GOTO statement - SWITCH statement.

Unit III

C Functions: Mathematical functions - sin - cos - tan -asin - acos - atan - sqrt - pow - log - String functions - stripy - stroat - stremp - strelen - strlwr - strupr and user - defined functions.

Unit IV

Arrays and structures: Arrays, definitions, declarations, entering values in - manipulating arrays - examining and passing an array. Structure: definitions - assigning structure variable - assigning initial values - using a structures - structure arrays - structures and functions.

Unit V

Pointers and File Operations: Understanding pointers - pointers and functions - File Operations: Understanding files - declaring a file - opening a file - closing a file - input and output functions - formatted input and output - working with structures adding data to a file - reading a printing a disk file.

Text Book

E. Balagurusamy, "Programming in C", Tata McGraw Hill, 2000.

References

R. C. Hutchison & S. B. Just, "Programming Using The C Language" McGraw Hill, 1988.

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CORE COURSE – V - Organizational Behavior

Unit I

Introduction to Organizational Behavior –Related Disciplines – Theoretical Framework – Organizational Approaches – Modern Organizational Scenario: Impact of Globalization

Unit II

Individual Behavior – Perception – Process – Changes - Personality and Attitudes – Job Satisfaction

Unit III

Motivation: Needs, Content and Process: Motivation: Content Theories – Process Theories – Contemporary Theories – Motivation Applied – Job Design and Goal setting. Leadership – Background – Process- Styles – Activities – Skills

Unit IV

Group Dynamics – The nature of Informal Organizations – Formal Groups – Interactive conflict: Interpersonal conflict – Inter-group behavior and conflict – Negotiation Skills: Going beyond conflict management – Traditional Negotiation Approaches - Contemporary negotiation skills.

Unit V

Communication – Role and background – Interpersonal communication – Informal communication- The Decision Making process – Participative Decision making techniques – Organization design – culture – Organization change and development

Text Book:

1. Fred Luthans, Organizational Behavior, 9th Edition, McGraw-Hill Irwin, 2002.
2. John W. Newstorm and Keith Davis, Organizational Behavior, Tenth Edition, TMG, 1998.

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Core Course VI - C Programming Lab

Write C programmes to implement the following:

1. SORTING:

    a. Bubble Sort
    b. Insertion Sort
    c. Selection Sort
    d. Heap Sort
    e. Quick Sort

2. SEARCHING:

    a. Linear Search
    b. Binary Search

3. Matrix Manipulations
4. Polynomial Addition & Multiplication
5. Operations on Stack and Conversion of expressions
6. Operations on Queue
7. Operations on Linked List
8. Operations on Doubly Linked List
9. Operations on Binary tree and Traversals
10. Dijkstra's Algorithms to find the Shortest Path
11. File Processing

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Core Course VII - Office Automation Lab

WORD PROCESSING

1. Text manipulation
   Change the font size and type
   Aligning and justification of text
   Underlining the Text
   Indenting the Text
   i. Prepare a Bio-Data
   ii. Prepare a letter

2. Usage of Numbering, Bullets, Footers and Headers
   Usage of Spell checks and Find and Replace
   i. Prepare a document in news paper format
   ii. Prepare a document with bullets and footers and headers.

3. Tables and Manipulations
   Creations, Insertion, Deletion (Columns & Rows) and usage of Auto Format
   i. Create a mark sheet using table and find out the total marks.
   ii. Create a calendar and Auto format it

4. Picture Insertion and alignment
   i. Prepare a greeting card
   ii. Prepare a handout

5. Creation of documents using templates Creation of Templates
   i. Prepare a letter using any template
   ii. Prepare two data using various kinds of templates

6. Mail Merge concepts
   i. Prepare a business letter for more than one company using mail merge
   ii. Prepare an invitation to be sent to specific addresses in the data source.

7. Copying text and pictures from Excel
   i. Draw a chart in Excel and paste it on word
   ii. Import a picture from Excel and edit the picture.

ELECTRONIC WORK SHEET

i. Usage of Formulae and built in functions
ii. Describe the types of functions
iii. File manipulations
iv. Data sorting – Ascending and descending
v. Worksheet preparation
vi. Mark list Preparation for a student
vii. Individual Pay Bill Preparation
viii. Electricity Bill preparation
ix. Inventory Report Preparation
x. Invoice Report Preparation
xi. Drawing Graphs
xii. Usage of Auto formatting

PRESENTATION SOFTWARE

i. Creating presentation using Blank presentation
ii. Creating presentation using Auto content Wizard
iii. Customizing background of slide master
iv. Working with Graphs and Objects
v. Exercises on slide transition and animation
vi. Usage of Design templates.

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Semester – II

Core Course – VIII -Database Systems

Unit I

Introduction – purpose of database systems – Data Abstraction – Data models – Instances and schemes – Data independence – DDL – DML – Database users – ER model – Entity sets – Keys – ER diagram – relational model – Structure – Relations Algebra – Relational Calculus – Views.

Unit II

SQL – QBE – QUEL – Basic structure – various Operations – Relational database design problems in the relational data base design – Normalisation – normalization using functional, Multi value and join dependencies**.**

Unit III

File and system structure – overall system structure – file Organization – data dictionary – Indexing and hashing – basic concept B and B+ tree indices – Static and Dynamic hash functions.

Unit IV

Recovery and atomicity – failures classification and types – Transaction model and Log based recovery, schedules – serial and non-serial types – Serialization of schedules and views – testing for seriability – lock based protocols – time based protocols – validation techniques – multiple Granularity – multiversion schemes – insert and delete Operations.

Unit V

Distributed data bases – structure of distributed databases – Trade offs in Distributing the database – Transparency and autonomy – distributed query processing – recovery in distributed systems – commit protocols – security and integrity violations – authorization and views – security specification – encryption – Statistical databases.

Text Book(s):

Henry F.Korth, and Abraham Silberschatz,, Sudarshan "Database system Concepts", McGraw Hill, 4th Edition, 2002

References:

1. Pipin C.Desai, "An Introduction to data base systems", Galgotia Publications Private Limited, 1991.
2. C.J.Date, "An Introduction to Database Systems", 3rd Edition, Addison Wesley 1983.

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Core Course – IX - C++ Programming

Unit I

What is Object Oriented Programming? – C++ Console I/O- C++ comments- Classes: Some difference between C and C++ - Introducing Function Overloading - Constructor and Destructor Functions- Constructors take parameters- Introducing Inheritance – Object Pointers – In line Functions – Automatic in lining.

Unit II

Assigning Objects – Passing Object to Functions – Returning Object from Functions- An Introduction to friend functions- Arrays of objects – Using Pointers to Objects – Using new & delete – More about new & delete – references – Passing references to objects - Returning references- Independent References and restrictions.

Unit III

Overloading Constructor Functions- Creating and Using a Copy constructor- Using default arguments- Overloading and ambiguity – Finding the address of an overload function- the basics of operator overloading- overloading binary operators- overloading the relational and logical operators- overloading a Unary operator – using friend operator functions- a closer at the assignment operator- overloading the subscript() operator.

Unit IV

Base class access control –using protected members- Constructors, destructors and inheritance - multiple inheritance- virtual bas classes- Some C++ I/O basics- formatted I/O using width(), precision () and fill() – using I/O manipulators- Creating your own inserters- creating extractors.

Unit V

Creating your own manipulators- File I/O basics- unformatted, binary I/O- more unformatted I/O functions- random access- checking the I/O status- customized I/O and files- Pointers and derived classes- Introduction to virtual functions- more about virtual functions- applying polymorphism- Exception handling.

Text Book(s)

Herbert Schildt, "Teach Your self C++", III edition, Tata McGraw Hill 5th Reprint 2000.

Reference(s)

1. Robert Lafore, "Object Oriented Programming in Turbo C++", Galgotia 2001
2. E. Balagurusamy "Object Oriented Programming with C++ ", TMH New Delhi

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Core Course – X - Discrete Mathematics

Unit I

Sets, Relations & Functions: Property of binary relations, equivalence, compatibility, partial ordering relations, Hasse diagram, functions, inverse functions, compositions of functions, recursive functions.

Unit II

Mathematical logic: Logic operators, Truth tables, Theory of inference and deduction, mathematical calculus, predicate calculus, predicates and qualifiers.

Unit III

Groups & Subgroups: Group axioms, permutation groups, subgroups, cosets, normal subgroups, semi groups, free semi-groups, monoids, sequential machines, error correcting codes, modular arithmetic grammars.

Unit IV

Lattices & Boolean Algebra: Axiomatic definition of Boolean algebra as algebra as algebraic structures with two operations , basic results truth values and truth tables, the algebra of propositional functions, Boolean algebra of truth tables.

Unit V

Combinatorics & Recurrence Relations: Disjunctive and sequential counting, combinations and permutations, enumeration without repetition, recurrence relation, Fibonacci relation, solving recurrence relation by substitution, solving non-recurrence relation by conversion to linear recurrence relation.

Text Book(s)

1. Trembly. J.P & Manohar. P., " Discrete Mathematical Structures with Applications to Computer Science" McGraw Hill.

2. Kolman, Busy & Ross "Discrete Mathematical Structures", PHI

3. K.D Joshi, "Foundations of Discrete Mathematics", Wiley Eastern Limited.

References

1. Seymour Lipschutz & March Lipson Tata Mc Graw Hill.
2. C.L.Liu " Elements of screte mathematics " Tata McGraw Hill.

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Core Course – XI - Accounting and Financial Management

Unit I

Accounting Principles and Concepts – Double entry book keeping- Income and expenditure- Accounting record and system- assets and liabilities- Depreciation, Depletion and Amortization - Accounting for depreciation.

Unit II

Journal – Ledger- Trial Balance- Trading, Manufacturing and profit and Loss account – Balance sheet.

Unit III

Analysis and interpretation of financial statements with ratios

Unit IV

Cost Accounting- Methods and Techniques of Cost Accounting- classifications of cost - Material Cost- Labour Cost – Overhead- fixed and variable cost- Cost- volume – profit analysis - marginal costing and decision making.

Unit V

Budgeting and budgetary control – types of budgets- Preparation of various functional budgets- Preparations of cash budgets- flexible budgets- Advantages of Budgeting and Budgetary control.

Text Book(s):

1. T.S.Grewal, "Double Entry Book Keeping", All India Sultan Chand (Recent Edition)
2. S.N. Maheswari "Principles of Management Accounting ", Sultan Chand, New Delhi (Recent Edition)
3. Shukla, Grewal & Gupta, "Advanced Accounts "Sultan Chand Publications

Reference(s):

1. S.K. Gupta & R.K. Sharma- Practical Problems in Management Accounting (Recent edition)
2. Khan and Jain "Financial Management" Tata McGraw Hill (Recent Edition)

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Core Course – XII - C++ Programming Lab

I – Functions

a. Write a function in C++ to generate a Fibonacei series of n numbers
b. Develop a program in C++ to find the largest of any 3 numbers using Macro definitions
c. Write a function called zeroSmaller ( ) that passes two int arguments, by

reference and then sets the smaller of the two numbers to O. Write a main ( ) program to exercise this function.

II – Using Classes

a. Create a class that imitates part of the functionality of the basic data type int. Call the class Int (note different spelling). The only data in this class is an int variable. Include member functions to initialize an int to O, to initialize it to an int value, to display it (it looks just like an int), and to add two int values.

Write a program that exercises this class by creating two initialized and one uninitialized int values, adding these two initialized values and placing the response in the uninitialized values, and then displaying this result.

b. Create a class time that has separate int member data for hours, minutes, and seconds. One constructor should initialize data to O, and another should initialize it to fixed values. A member function should display it, in 11.59.59 format. The final member function should add two objects of type time passed as arguments.

A main ( ) program should create two initialized time objects, and one that isn't initialized time objects, and one that isn't initialized . Then it should add the two initialized values together, leaving the result in the third time variable. Finally it should display the value of this third variable.

c. Develop an object oriented program in C++ to read the following information from the keyboard:

a. Employee name
b. Employee code
c. Designation
d. Years of experience
e. Age and

III - Using Polymorphism

Create a base class called shape. Use this class to store two double type values that could be used to compute the area of figures. Derive two specific classes called triangle and rectangle from the base shape. Add to the base class, a member function get_data ( ) to initialize base class data members and another member function display – area( ) to compute and display the area of figures. Make display_area () as a Virtual function and redefine this function in the derived classes to suit their repuirements. Using these three classes design a program that will accept dimensions of a triangle or rectangle interactively and display the area.

IV – Using Inheritance

a. Develop an object oriented program in C++ to create a data base of the following items of the derived class.
a. name of the patient
b. sex
c. age
d. ward number

e. bed number
f. nature of the illness
g. date of admission

Design a base class consisting of the data members namely, name of the patient, sex and age. Another base class consists of ward numbers, bed number and nature of the illness. The derived class consists of the data member date of admission. Design a virtual class for the data member, namely name of the patient, sex and age.

V - Using Overloading

a. Write a program in C++ using function overloading to read two matrices of different data types such as integers and floating point numbers. Find out the sum of the above two matrices separately and display the total sum of these arrays individually.

b. Create a class FLOAT that contains one float data member. Overload all the four arithmetic operators so that operate on the objects of FLOAT.

VI – Using Constructors and Destructors

Write an object oriented program in C++ to read an integer number and find the sum of all the digits until it reduces to a single digit using constructors, destructor, default constructor and inline member functions.

VII – Using Pointers

Write a C++ program to find out the number of vowels in each word of a given text using a pointer.

VIII – Using Files

a. Write a C++ program to read a file and display the contents of the file on the screen with line numbers.
b. Write a C++ program to merge two files into a one file heading,
c. Case studies:
    i. Paybill Preparation
    ii. Marklist Preparation.
    iii. Student Information System

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Core Course – XIII - Operating Systems Lab

Write Shell Programming to implement the following:

1. Mark list preparation
2. Menu Creation
3. Login Greetings Script
4. Copying files
5. Searching a word in a file
6. Compression techniques
7. Paragraph formatting
8. User Creation
9. Group Creation
10. Cron Scheduling

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Elective – I - OOAD and UML

UNIT-I

Structured approach to system construction : SSADM/SADT - An overview of object oriented systems development & Life cycle

UNIT-II

Various object oriented methodologies – Introduction to UML

UNIT-III

Object oriented analysis – Use cases- Object classification, relationships, attributes, methods

UNIT-IV

Object oriented design – Design axioms – Designing classes – Layering the software design :- data access layer, User interface layer, Control/business logic layer

UNIT-V

UML - Examples on : Behavioral models – Structural models – Architectural models from real world problems.

TEXT BOOK:

1. **Bahrami Ali**, Object oriented systems development, Irwin McGrawHill, 2005 (First 4 units covered here).
2. **Booch Grady, Rumbaugh James, Jacobson Ivar**, The Unified modeling language – User Guide, Pearson education, 2006 (ISBN 81-7758-372-7) (UNIT -5 covered here).

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Elective – I - B. Distributed Operating Systems

Unit I

Fundamentals: What is Distributed Operating System – Evolution of Distributed Computing System – Distributed Computing System Models – Why are Distributed Computing Systems gaining popularity – What is a Distributed Computing System – Issues in Designing Distributed Computing System – Introduction to Distributed Computing Environment.
Introduction to Computer Networks – Network types – LAN –WAN – Communication protocols – Internetworking – ATM Technology

Unit II

Message Passing: Introduction – Desirable features – Issues in PC Message Passing – Synchronization – Buffering – Multidatagram Messages – Encoding and Decoding – Process Addressing – Failure Handling – Group Communication

Unit III

Distributed Shard Memory: Introduction – General Architecture of DSM system – Design and Implementation Issues of DSM – Granularity – Structure of Shared Memory – Consistency Models – Replacement Strategy – Thrasing – Other Approaches to DSM – Heterogeneous DSM – Advantages

Synchronization: Introduction – Clock Synchronization – Event Ordering – Mutual Exclusion – Deadlock – Election Algorithm

Unit IV

Distributed File System: Introduction – Desirable features – File Models – File Accessing Models – File Sharing Semantics – File Caching

Schemes – File Replication – Fault Tolerance – Atomic Transactions – Design Principles

Unit V

Security: Introduction – Potential Attacks to Computer System – Cryptography – Authentication – Access Control – Digital Signatures – Design Principles

Text Book

Distributed Operating Systems – Concepts and Design, Pradeep K Sinha, PHI, 2003

References:

Distributed Operating Systems 1e, Andrew S Tanenbaum, PHI.

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Elective – I - C. SYSTEM ANALYSIS AND DESIGN

Objective: *To teach students about complete set of activities performed by a software developer (and the role of various stake holders) in constructing a real world software system*

UNIT I

Context of Systems Analysis and Design methods – Information System building block – Strategies for information Systems development – Activities in Project management.

UNIT II

Detailed study of Phases of Systems analysis – Techniques for requirement discovery – Modeling the system requirements (only outline).

UNIT III

Detailed study of Process modeling – Feasibility analysis and the system proposal – Tasks in System design.

UNIT IV

Application architecture and modeling – Input/output design & Prototyping – User interface design.

UNIT V

System construction/Implementation - Operation and Support.- case study using "Employee monthly salary bill Generation system"

TEXT BOOK:

1. Whitten Jeffrey L. & Bentley Lonnie D., Systems Analysis and design methods, Seventh edition, Tata McGraw-Hill, , 2007
[Unit-1 (Chapters 1,2,3,4) ; **Unit-2 (**Chapters 5,6,7) ; **Unit-3 (**Chapters 9,11,12) ; **Unit-4 (**Chapters 13,15,16,17) ; **Unit-5 (**Chapters 19,20)]

REFERENCE BOOK

1. Kendall. K.E & Kendall. J.E, System analysis and design, Fifth edition, Prentice Hall of India/Pearson education, 2006

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Skill Based Course I

Soft Skills Development

Note: No Instructor is required for this course. However a special seminar or workshop may be conducted twice in a semester.

Course Objective: To develop soft skills, particularly time management, leadership qualities, lateral thinking, interpersonal skills and communication skill. The curriculum also focuses on listening, office communication, presentation and netiquette.

This course helps the students in getting exposed to different modes of interview and recruitment process as well.

Unit I: Behavioral Skills

Unit II: Business Communication

Unit III: Group Dynamics

Text Book:

G. Ravindran, S.P. Benjamin Elango and L. Arockiam, "Success through Soft Skills", ICT, 2007

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Semester III

Core Course XIV - Computer Networks

Unit I

Computer Networks - Applications - Line configuration - Topology - Transmission Modes - Categories of Network: LAN, MAN, WAN - OSI Layer. Physical Layer: Signals - spectrum - bandwidth of analog/digital signals – signal encoding - DTE-DCE interface - Transmission Media - Multiplexing : FDM, TDM.

Unit II

Data Link Layer: Error Detection - Error correction - Line discipline Flow Control: stop - wait protocol and sliding window protocol Error control: ARQ, Go-back-n ARQ, selective - repeat ARQ. Data Link Protocols: Asynchronous protocols – synchronous protocol: character oriented - bit oriented protocols - HDLC. LLC, MAC, PDU. MAN: DQDB - SMDS.

Unit III

Network Layer: Circuit switching - packet switching - message switching - Connection oriented and connectionless services. Routing Algorithms – congestion control Algorithms - internetworking - Routers and Switches - Introduction to firewalls- Wide Area Network - X.25 - Frame Relay - Frame relay - Protocol Architecture - Frame relay call control - User Data Transfer Network Function – Congestion Control.

Unit IV

LAN Protocols: Ethernet - Token Ring - Token Bus - FDDI - Addressing and Frame format – Bridges - LAN Security: Types of threats - Levels of security Case Study: Novell Netware - Wireless LAN: need - components - Receiving Devices - advantages &disadvantages

Unit V

TCP/IP Networking : TCE/IP Architecture - Structural overview – Inter networking model - Protocol evolution - Division of functions - Network characteristics - implementation characteristics - Network addressing and Routing: Datagram Header - IP address space - Basic routing consideration -Hardware addressing – Common interior Gateway Protocols - Internet control Message Protocol. Transport Layer: Data flow, ports, sockets - user Data gram protocol - Transmission control protocol - TCP Header - connection establishment and termination - TCP Reliable Delivery & Flow control - Applications and services: Domain name system - Remote Logon – Mail Exchange - File Transfer - Remote Procedure Call - Remote File Access - Security - Window system.

Text Book(s)

Data Communication and Networking, Behruz A. Ferouzon, Tata McGraw, 2004.

References

1. Computer Networks - III edition - Andrew S.Tanenbaum - Pearson Edun. 1998.
2. Data and Computer Communication – William Stallings, Pearson Education, 5thEdition, September 2000

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Core Course XV - PROGRAMMING IN JAVA

UNIT-I

Introduction – Literals – Data types – The structure of Java program – Operators – Control statements

UNIT-II

Arrays – Classes - Inheritance

UNIT-III

Packages and Interfaces – Wrapper classes – mathematical methods – Exceptions

UNIT-IV

Input and Output classes

UNIT-V

Threads – Applets - Graphics.

TEXT BOOK:

1. Dr. K. Somasundaram, "Programming in Java 2", Jaico Publishing House - 2008

REFERENCE BOOK

1. Ken Arnold, Games Gosling, David Holmes, "The Java Programming Language", 3rd Edition, TMH
2. Patric Naughton and Herbert Schildt, "Jave 2 Complete Reference", TMH, 1999
3. Nortron Peter and William Stanek, "Guide to Java Programing", Samsnet 1996

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CORE COURSE XVI - DESIGN AND ANALYSIS OF ALGORITHMS

UNIT I - BASIC CONCEPTS OF ALGORITHMS

Introduction – Notion of Algorithm – Fundamentals of Algorithmic Solving – Important Problem types – Fundamentals of the Analysis Framework – Asymptotic Notations and Basic Efficiency Classes.

UNIT II - MATHEMATICAL ASPECTS AND ANALYSIS OF ALGORITHMS

Mathematical Analysis of Non-recursive Algorithm – Mathematical Analysis of Recursive Algorithm – Example: Fibonacci Numbers – Empirical Analysis of Algorithms – Algorithm Visualization.

UNIT III -ANALYSIS OF SORTING AND SEARCHING ALGORITHMS

Brute Force – Selection Sort and Bubble Sort – Sequential Search and Brute-force string matching – Divide and conquer – Merge sort – Quick Sort – Binary Search – Binary tree-Traversal and Related Properties – Decrease and Conquer – Insertion Sort – Depth first Search and Breadth First Search.

UNIT IV - ALGORITHMIC TECHNIQUES

Transform and conquer – Presorting – Balanced Search trees – AVL Trees – Heaps and Heap sort – Dynamic Programming – Warshall's and Floyd's Algorithm – Optimal Binary Search trees – Greedy Techniques – Prim's Algorithm – Kruskal's Algorithm – Dijkstra's Algorithm – Huffman trees.

UNIT V - ALGORITHM DESIGN METHODS

Backtracking – n-Queen's Problem – Hamiltonian Circuit problem – Subset-Sum problem – Branch and bound – Assignment problem – Knapsack problem – Traveling salesman problem.

TEXT BOOKS

1. Anany Levitin, "Introduction to the Design and Analysis of Algorithm", Pearson Education Asia, 2003.

REFERENCES

1. T.H. Cormen, C.E. Leiserson, R.L. Rivest and C. Stein, "Introduction to Algorithms", PHI Pvt. Ltd., 2001
2. Sara Baase and Allen Van Gelder, "Computer Algorithms - Introduction to Design and Analysis", Pearson Education Asia, 2003.
3. A.V.Aho, J.E. Hopcroft and J.D.Ullman, "The Design and Analysis Of Computer Algorithms", Pearson Education Asia, 2003.

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CORE COURSES XVII - PROBABILITY AND STATISTICS

Unit I

Probability: Definitions of probability, Addition theorem, Conditional probability, Multiplication theorem, Baye's theorem of probability and Geometric probability. Random variables and their properties, Discrete Random variable, Continuous Random variable, Probability Distribution joint probability distributions their properties, Transformation variables, Mathematical expectations, probability generating functions

Unit II

Probability Distributions / Discrete distributions: Binomial, Poisson Negative binominal distributions and their properties. (Definition, mean, variance, moment generating function, Additive properties, fitting of the distribution.)
Continuous distributions: Uniform, Normal, exponential distributions and their properties. Curve fitting using Principle of Least Squares.

Unit III

Multivariate Analysis: Correlation, correlation coefficient, Rank correlation, Regression Analysis, Multiple Regression, Attributes, coefficient of Association, X2 – test for goodness of fit, test for independence.

Unit IV

Sample, populations, statistic, parameter, Sampling distribution, standard error, unbiasedness, efficiency, Maximum likelihood estimator, notion & interval estimation. Testing of Hypothesis: Formulation of Null hypothesis, critical region, level of significance, power of the test.

Unit V

Queuing theory: Queue description, characteristics of a queuing model, study state solutions of M/M/1: α Model, M/M/1 ; N Model.

Text book:

1. T.Veerarajan , "Probability, Statistics and Random Processes" , Tata McGraw Hill

Reference Book:

2. Kishor S. Trivedi, "Probability & Statistics with Reliability, Queuing and Computer Applications" , Prentice Hall of India ,1999

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CORE COURSE XVIII - J2SE TECHNOLOGY LAB

1. Assume that a bank maintains 2 kinds of account for its customers' one called savings account and the other current account' The savings account provides compound interest and withdraw facilities but no cheque book facility. The current account provides cheque book facility but no interest. Current account falls below this level a service charge is imposed. Create a class Account that stores customers name' account number and type of account. From this derive the classes curr-acct and sav-acct to make them more specific to their requirements. Introduce the necessary methods in order to achieve the following tasks:

    a. Accept deposit form a customer and update the balance.
    b. Display any deposit interest
    c. Compute and deposit interest.
    d. Permit withdrawal and update the balance.
    e. Check for the minimum balance' impose penalty' if necessary and update the balance.

2. Use constructors and methods to initialize the class members.
   Write a program that accepts a shopping list of five items from the command line and stores them in a vector and accomplish the following:
   a. To delete an item in the list.
   b. To add an item at a specified location in the list.
   c. To add an item at the end of the list.
   d. To print the contents of the vector.

3.Implementation of the concept of multiple inheritance using interfaces and design a package to contain the class students and another package to contain the interfaces sports.

4. Develop a simple real-life application program to illustrate the use of multithreads.

5. Create a try block that is likely to generate three types of exception and then incorporate necessary catch blocks to catch and handle them appropriately.

6. Write a Java applet' which will create the layout below:
FORMAT
Enter your Name:
Enter your Age:
Select City: *Delhi *Madras
Select SIW: *Oracle *Visual Basic *Java
OK CANCEL
Handle the following simple validations.
The name entered should be less than 25 characters wide.
Age entered should be done as the user exits the fields as well as when OK button is pressed. Hint use the Boolean action (Event evt' object arg).
7. Write an Applet which will play two sound notes in a sequence continuously use the play( ) methods available in the applet class and the methods in the Audio clip interface.

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CORE COURSE XIX - RDBMS LAB

1. Creating & updating and inserting into database & simple queries.

2. Uses of Select statement - for queries.

a. AND' OR' NOT Operators' WHERE clause.
b. UNION' INTERSECTION' MINUS.
c. Sorting and grouping.

3. Nested queries using SQL.
a. Sub queries.
b. Join.

4. Built-in-functions of SQL.

5. Use of indexes' creating views and querying in views.

6. Cursors' triggers and stored procedures and functions.

7. Case studies:

a. Student evaluation systems.
b. Pay - roll system
c. Income tax calculations.
d. Seat reservation Problems
e. Mark - sheet Preparation.

Elective II

1. Middleware Technologies

Unit I

Client-Server architecture: 2-tier model – 3-tier model – n-tier model – J2EE architecture – DOTNET architecture – MVC architecture

Unit II

Présentation services: Servlets – JSP – Interaction services: RMI – CORBA – XML – JAXP - JMS – Data Management services: JDBC

Unit III

Component model: EJB : Session Beans : Stateless and Stateful – Entity Beans – CMP and BMP - Message Driven Beans

Unit IV

ASP.NET : Introduction – architecture – ASP.NET Runtime – Internet Information Services – Visual Web Developer Web Server – ASP.NET Parser – Assembly – Page class. Web Server Controls – HTML Controls – AdRotator and Calendar controls – Validation Controls – Security Management.

Unit V

ASP.NET and ADO.NET: System.Data, SqlClient and Xml namespaces – Provider objects and Consumer objects – Disconnected data access – GridView FormView. Web Services: Provider – WSDL – UDDI – SOAP – HTTP – Developing simple web services – Connecting a Web Service to a data source – Developing ASP.NET Clients for Web Services.

Text Book(s)

1. Justin Couch and Daniel H Steinberg, "J2EE bible", Willey India Pvt. Ltd, New Delhi, 2002.
2. Paul Tremblett, "Instant Enterprise Java Beans", TMH Publishing company, New Delhi, 2001

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Elective II **2. PERVASIVE COMPUTING**

Unit I:

Pervasive Computing: Past, Present and Future - Pervasive Computing Market – m-Business – Application examples: Retail, Airline check-in and booking – Health care – Car information system – E-mail access via WAP and voice.

Unit II:

Device Technology: Hardware – Human Machine Interfaces – Biometrics – Operating Systems – Java for Pervasive devices.

Unit III:

Device Connectivity: Protocols – Security – Device Management - Web Application Concepts: WWW architecture – Protocols – Transcoding - Client Authentication via Internet.

Unit IV:

WAP and Beyond: Components of the WAP architecture – WAP infrastructure – WAP security issues – WML – WAP push – Products – i-Mode - Voice Technology: Basics of Speech recognition- Voice Standards – Speech applications – Speech and Pervasive Computing.

Unit V:

PDA: Device Categories – PDA operation Systems – Device Characteristics – Software Components - Standards – Mobile Applications - PDA Browsers - Pervasive Web Application architecture: Background – Development of Pervasive Computing web applications - Pervasive application architecture.

Text Book:

Pervasive Computing, Technology and Architecture of Mobile Internet Applications, Jochen Burkhardt, Horst Henn, Stefan Hepper, Thomas Schaech & Klaus Rindtorff, Pearson Education, 2006.

Reference Book:

Fundamentals of Mobile and Pervasive Computing, Frank Adelstein, Sandeep KS Gupta, Golden Richard III, Loren Schwiebert, McGraw Hill edition, 2006.

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Elective II -ENTERPRISE RESOURCE PLANNING

Objective: *In this course students shall learn various components of an application software that help computerize functioning of an enterprise such as sales, materials, production, financial , customer relationship AND supply chain modules.*

UNIT-I

A Foundation for Understanding Enterprise Resource Planning systems – Re-engineering and Enterprise Resource Planning Systems – Planning ,Design ,and Implementation of Enterprise Resource Planning Systems – ERP Systems: Sales and Marketing – ERP Systems: Accounting and finance ERP Systems :Production and Materials Management ERP Systems: Human Resources

UNIT-II

Managing an ERP Project – Supply chain Management and the marketplace – Rules of the game – Winning as a team.

UNIT-III

Solutions - Supply chains as Systems - Modeling the Supply Chain – Supply Chain Software - **Operations** – Meeting Demand – Maintaining Supply – Measuring Performance

UNIT-IV

Planning – Forecasting Demand – Scheduling Supply – Improving performance – Mastering Demand – Designing the Chain – Maximizing Performance

UNIT-V

Essentials of Customer relationship management – Designing CRM application – Various modules of CRM application - Advantages of CRM

TEXT BOOK:

1. **Sumner Mary**, Enterprise Resource Planning , First edition, Pearson education, 2006(ISBN 81-317-0240-5) (**Unit 1**: Chapters 1 to 7; **Unit 2:** Chapters 8,9 (continued on text book number TWO))
2. **Taylor David A**., Supply Chains (A managers guide), Pearson education, 2004 (ISBN 81-297-0334-3) (**Unit 2:** Chapters 1,2,3; **Unit 3:** Chapters 4,5,6,7,8,9; **Unit 4:** Chapters 10,11,12,13)
3. **Tiwana**, Essential guide to knowledge management : The e-business and CRM applications, Pearson education (ISBN 81-780-8326-4) **(Unit 5)**

REFERENCE BOOK:

1. **ALTEKAR Rahul V**., Enterprise wide resource planning (Theory and practice), Prentice Hall of India, 2005 (ISBN 81-203-2633-4)

2. **Garg Vinod K & Venkitakrishnan N.K**, Enterprise resource planning, Second edition, Prentice Hall of India, 2006 (ISBN 81-203-2254-1).
3. **Handfield R. B & Nichols. Ernest L**., Introduction to supply chain management, Prentice Hall of India, 2006 (ISBN 81-203-2753-5)

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Elective II- 4. PRINCIPLES OF PROGRAMMING LANGUAGES

Unit 1

The Study of Programming Languages – Why Study Programming Languages ? – A Short History of Programming Languages – What Makes a Good Language? – Effects of Environments on Languages. Language Design Issues: The Structure and Operation of a Computer – Virtual Computers and Binding Times – Languages Paradigms. Language Translation Issues: Programming Language Syntax – Stages in Translation – Formal Translation Models.

Unit II

Elementary and structured data type: Data object variables, constants, data type, elementary data types, declaration, assignments and initialization, enumeration, characters strings.

Structured data type and objects: Specification of data structured types, vectors and arrays, records, variable size data structure, pointers and programmer constructed data structure, Set files.

Imperative Languages: Block structure, Scope rules, Parameter Passing, Construct like co-routines, Tasks etc.

Unit III:

Object Oriented languages: The class notion- Information hiding and data abstraction using classes, derived classes and inheritance– Polymorphism – Parameterized types.

Unit IV

Functional languages: Functional programming concepts – Referential transparency – Types – Type systems - Names, bindings, environment and scope – Recursive functions – Polymorphic functions – Type variables – High order functions – Curried functions – Lists and programming with lists – Definition of new user defined types in ML – Abstract data types – Evaluation methods.

Unit V

Logic languages: Review of predicate logic – Clause-form logic – Logic as a programming language- Unification algorithm - Abstract interpreter for logic programs – Theory of logic programs – Applications of Logic programming - Introduction to Prolog, Data Structures in Prolog, Programming techniques, Control in Prolog

Text Book

"Programming Languages – Design and Implementation" - by Terrence W. Pratt & Marvin V. Zelkowitz, Fourth Edition
"Programming Languages – Concepts & Constructs" - by Ravi Sethi, Pearson Education.
Reference Books
"Programming Language Design Concepts"– by David A. Watt and William Findlay
"Fundamentals of Programming Languages" – by Ellis Horowitz – SecondEdition

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SEMESTER IV
Core Course – XX - WEB TECHNOLOGIES

Unit I

Introduction – What are web services? SOAP WSDL UDDI-Why Web Services are important ? – The evolution of web applications Not just another distributed computing platform – Web services and enterprises.

Unit II

XML Fundamentals XML: The Lingua Franca of web services- XML Documents-XML namespaces Explicit and Default namespaces, Inheriting namespaces, And not inheriting namespaces, Attributes and namespaces –XML Schema XML schema and namespaces, A first schema, Implementing XML schema types, The any Element, Inheritance, Substitution groups, Global and local type declarations, Managing Schemas, Schemas and instance documents, XML schema best practices- Processing XML SAX: Simple API for XML, DOM: Document object Model, XSLT, XPATH

Unit III

SOAP and WSDL5 The SOAP Model- SOAP- SOAP Messages SOAP Envelope, SOAP Header, SOAP Body, SOAP Faults- SOAP encoding – SOAP RPC- Using alternative SOAP Encodings, Document, RPC, Literal, Encoded SOAP RPC and SOAP Document-Literal, SOAP web services and the REST Architecture- Looking back to SOAP 1.1 Syntactic differences between SOAP 1.2 and SOAP 1.1- Changes to SOAP-RPC- SOAP Encoding- WSDL structure, The stock quote WSDL interface, definitions, The type element, bindings, services, managing WSDL descriptions, Extending WSDL – Using SOAP and WSDL

Unit IV

UDDI: UDDI at a glance- The UDDI Business registry- UDDI under the covers – Accessing UDDI- How UDDI is playing out Conversations Overview – Web Services – Web services Conversation Language – WSCL Interface components – The Bar scenario conversations – Relationship between WSCL and WSDL Workflow Business Process Management – Workflow and Workflow management systems – Business process execution language for web services

Unit V

Transactions ACID Transactions – Distributed Transactions and two phase commit – Dealing with Heuristic outcomes – Scaling transactions to web services – OASIS business transaction protocol – Other web services transaction Protocol Security Everyday security basis – Security is an end to end product – Web service security issues – Types of Security attacks and threats - Web services security road map – WS security

Text Book(s)

Sandeep Chatterjee, James Webber, "Developing Enterprise Web Services - An Architect's Guide" Pearson Education– Second Indian Reprint 2005.

References

Eric Newcomer, Greg Lomow, Understanding SOA with Web Services, , Pearson Education, First Indian Reprint 2005.

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CORE COURSE XXI - Distributed Technologies

Unit I

Introduction to distributed Computing – Challenges involved in establishing remote connection – Strategies involved in remote computation – Current Distributed computing practices through Dot Net and Java technologies

Unit II

Advanced ADO, NET – Disconnected Data Access – Gridview, Details View, Form View controls – Crystal Reports – Role of ADO, NET in Distributed Applications

Unit III

Advanced ASP, NET – AdRotator, Multiview, Wizard and Image Map Controls – Master Pages – Site Navigation – Web Parts – Uses of these controls and features in Website development

Unit IV

Advanced features of ASP.NET – Security in ASP, NET – State Management in ASP, NET – Mobile Application development in ASP, NET – Critical usage of these features in Website development

Unit V

Web services – Role of Web services in Distributed Computing – WSDL, UDDI, SOAP concepts involved in Web Services – Connected a Web Service to a Data Base – Accessing a Web Service through n ASP, NET application

Text Book(s)

1. Walther, ASP, NET 3.5, SAMS Publication, 2005

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Core Course – XXII - DATAMINING AND DATA WAREHOUSING

Objective: *In this course students shall learn the mathematical & algorithmic details of various data association techniques to discover patterns in underlying data (namely mining data).He also learn how to consolidate huge volume of data in one place efficiently.*

UNIT-I
Introduction to data mining – Association Rule Mining.

UNIT-II
Classification – Cluster analysis.

UNIT-III
Web Data Mining – Search engines.

UNIT-IV
Data warehousing – Algorithms & operations to create data warehouse – Designing data warehouse- Applications of data warehouse.

UNIT-V
Online analytical processing – Information Privacy.

TEXT BOOK:
1. **G.K.Gupta,** Introduction to Data mining with case studies ,Prentice Hall India , 2006 (ISBN 81-203-3053-6) **[Unit-1 :(**Chapters 1,2); **Unit-2** : (Chapters 3,4); **Unit-3 (**Chapters 5,6); **Unit-4 (**Chapters 7), **Unit-5 (**Chapters 8,9)**].**

REFERENCE BOOK:

1.K.P.Soman & Shyam Diwakar and V. Ajay, Insight to Data Mining Theory and Practice, Prentice Hall of India, 2006. (ISBN -81-203- 2897-3)
2. **Jiawei Han and Micheline Kamber** , Data Mining Concepts and Techniques ,Elsevier, Second Edition, 2007 (ISBN: 81-312-0535-5)

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CORE COURSE – XXIII - OPTIMIZATION TECHNIQUES

UNIT – I

Linear Programming : Introduction – History of OR – Meaning of OR – Principles of Modeling – Linear equation – Gaussian Elimination – Formulation of LP models – Graphical Solution – Algebraic Solutions – Simplex Method – Feasibility – Optimality – Artificial Variables – M – Technique – Duality – Dual simplex Algorithm – Transportation Problem – Assignment Problem – Least Time Transportation Problems.

UNIT – II

Queuing Models : Introduction – Deterministic Model – Queue Parameters – M/M/I Queue – Limited queue Capacity – Multiple Servers – Finite Sources – Waiting Times – Queue discipline – Non – Markovian Queues – Probabilistic models.

UNIT – III

Inventory Models: Determine Models – EOQ – Finite and Infinite Delivery Rates without Back- Ordering – Finite and Infinite delivery rates with Backordering – Quantity Discounts – EOQ with constraints – Probabilistic model – Single Period Model – Reorder Point Model – Variable Lead Times

UNIT – IV

PERT / CPM: Arrow (Network) Diagram Representation – Time estimates – Critical Path – Floats – Construction of Time chart and Resource Leveling – Probability and Cost Consideration in Project Scheduling – Project Control.

UNIT – V

Replacement Theory : Introduction – Various replacement situations – Replacement Policy – Variables Maintenance costs and fixed money value – Variable Maintenance Costs and Variable Money Value – Individual Replacement Policy – Group Replacement Policy – Reliability.

Text Book:

Kanti Swarup P.K.Gupta and Man Mohan, "Operation Research", Sultan & Chand Publishers New Delhi, 1992.

Reference Book:

1. Hamdy A Taha, Operations Research – An Introduction Macmillan Publishing Company, 1982.
2. Don.T.Philps, A.Ravindran, James.J.Solberg, "Operations Research – Principles and Practice John Wiley & Sons, 1976.

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CORE COURSE XXIV - Distributed Technologies Lab

1) Design a web page that makes uses of Ad Rotator Control. &
   Design a web page involving Multi View or Wizard Control.
2) Make use of Image Control involving two hot spots in a web page.
3) Design a simple web site that makes use of Master Pages.
4) Establish the security features in a simple web site with five pages.
5) Use state management concepts in a mobile web application.
6) Develop a web service that has an ASP.NET client.
7) Develop a web service to fetch a data from a table and send it across to the client.
8) Implement List and simulate a doubly linked list.
9) Write a Java Program Using Map that builds a French Dictionary (or any language like
.
10) Write a java networking program to implement a simple server that listens to a specific port and echoes back all client input.
11) Write a java program to insert, delete, update and select records from a table.
12) Write a Java server program which instantiate two remote objects, register them with naming service, and waits for clients to invoke methods on the remote objects.

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CORE COURSE XXV - WEB TECHNOLOGIES Lab.

1. Create a HTML table with rows & columns and split them using Rowspan and Colspan.
2. Create a web page in the format of front page of a news paper using Text links. Align the text with colors.
3. Write an XML document to display your bio-data. Write an XSL style sheet and attach that to the XML document. Validate the document using DTD or XSD.
4. Write an ASP program to prepare Employee pay bill using Java Script.
5. Write an ASP program to prepare student performance evaluation document using Java Script.
6. Create a Cookie and set the expiry time.
7. Create a Servlet to count the number of visits to a web page.
8. Implement JDBC connectivity and create, modify and insert records.
9. Using JSP create a form to validate a password .
10. Using JavaScript perform a client side validation.

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ELECTIVE – III - 1. PARALLEL PROCESSING

Unit I

Parallel computer models: the state of computing – Multiprocessors and multicomputers – Multivector and SIMD computers.

Unit II

Program and Network properties: Conditions of parallelism – Program partitioning and scheduling – program flow mechanisms – system interconnect architectures.

Unit III

Processors and memory hierarchy : Advanced processor Technology – Superscalar and vector processors – Linear Pipeline Processors – Nonlinear Pipeline Processors.

Unit IV

Multiprocessors and Multicomputers: Multiprocessor System Interconnects-Message-Passing Mechanisms – SIMD Computer Organization. The Connection Machine CM5 – Fine – Grain Multicomputers.

Unit V

Software for Parallel Programming : Parallel Programming Models – Parallel Languages and Compilers – Dependence Analysis of Data Arrays.

Books for reference:

1. "Computer Architecture and Parallel Processing", Kai Hwang and Baye
2. "Parallel Computing, Theory and Practice" Michel J.Quinn, McGraw-Hill International Edn., Singapore 1994

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ELECTIVE – III - 2. e-COMMERCE

Unit I

Electronic Commerce Framework – Electronic Commerce and Media Convergence – The Anatomy of E-Commerce Applications – Electronic Commerce Consumer Applications – Electronic Commerce Organization Applications. The Network Infrastructure for Electronic Commerce: Components of the High way – Network Access Equipment – Global information Distribution Networks.

Unit II

The Internet as a Network Infrastructure: The Internet Terminology – NSFNET Architecture and components – National Research and Education Network – Internet Governance – An overview of Internet Applications. The Business of Internet Commercialization :Telco/Cable/On-Line Companies - National Independent ISPs – Regional Level ISPs – Local –level ISPs – Internet Connectivity options.

Unit III

Electronic Commerce and the World Wide Web: Architectural Framework for Electronic Commerce – World Wide Web as the Architecture – Technology behind the Web – Security and the Web, Consumer-Oriented Electronic Commerce: Consumer-Oriented Applications – mercantile process model – mercantile models from the consumers perspective.

Unit IV

Electronic Payment Systems: Types of Electronic Payment Systems – Digital Token based Electronic Payment Systems – Credit Card – Based Electronic Payment Systems – Risk and Electronic Payment Systems – Designing Electronic Payment Systems. Inter Organizational Commerce and EDI: Electronic Data Interchange – EDI Applications in Business – EDI: Legal, Security and Privacy issues.

Unit V

Advertising and the Marketing on the Internet: The New Age of Information Search and Retrieval – Electronic Commerce Catalogs – Information filtering – Consumer – Data Interface – Emerging Tools. On Demand Education and Digital Copyrights: Computer-based Education and Training – Technological Components of Education on demand. Software Agents: Characteristics and Properties of Agents – The Technology behind Software Agents – Applets, Browsers and Software Agents.

Book for Study:

"Frontiers of Electronic Commerce", Ravikalakota & Andrew Whinston, Adison Wesley, 2000.

Book for Reference:

"Electronic Commerce", Pete Loshin & Paul A.Murphy, Second edition, Jaico Publishing House, 2000.

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ELECTIVE – III - 3. SOFTWARE ENGINEERING

UNIT 1: SOFTWARE PROCESS

Introduction –S/W Engineering Paradigm – life cycle models (water fall, incremental, spiral, WINWIN spiral, evolutionary, prototyping, object oriented) – system engineering – computer based system – verification – validation – life cycle process – development process –system engineering hierarchy.

UNIT 2: SOFTWARE REQUIREMENTS

Functional and non-functional – user – system –requirement engineering process – feasibility studies – requirements – elicitation – validation and management – software prototyping – prototyping in the software process – rapid prototyping techniques – user interface prototyping –S/W document. Analysis and modeling – data, functional and behavioral models – structured analysis and data dictionary.

UNIT 3: DESIGN CONCEPTS AND PRINCIPLES

Design process and concepts – modular design – design heuristic – design model and document. Architectural design – software architecture – data design – architectural design – transform and transaction mapping – user interface design – user interface design principles. Real time systems – Real time software design – system design – real time executives – data acquisition system – monitoring and control system. SCM – Need for SCM–Version control – Introduction to SCM process – Software configuration items.

UNIT 4: TESTING

Taxonomy of software testing – levels – test activities – types of s/w test – black box testing – testing boundary conditions – structural testing – test coverage criteria based on data flow mechanisms – regression testing – testing in the large. S/W testing strategies – strategic approach and issues – unit testing – integration testing – validation testing – system testing and debugging.

UNIT 5: SOFTWARE PROJECT MANAGEMENT

Measures and measurements – S/W complexity and science measure – size measure – data and logic structure measure – information flow measure. Software cost estimation – function point models – COCOMO model- Delphi method.- Defining a Task Network – Scheduling – Earned Value Analysis – Error Tracking – Software changes – program evolution dynamics – software maintenance – Architectural evolution. Taxonomy of CASE tools.

Text Books:

1. "Software engineering- A practitioner's Approach" , Roger S.Pressman, McGraw-Hill International Edition, 5 th edition, 2001.
2. "Software engineering", Ian Sommerville, Pearson education Asia, 6 th edition, 2000.
3. "Software Engineering Concepts ", Richard E. Fairley, McGraw-Hill edition, 2002.

Reference Books:

1. "Software Engineering – An Engineering Approach", James F Peters and Witold Pedryez, John Wiley and Sons, New Delhi, 2000.

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ELECTIVE – III - 4. RFID

Unit – I

An introduction to RFID – RFID architecture

Unit – II

Tags – Tag protocols

Unit – III

Readers and Printers – Reader Protocols

Unit – IV

RFID Middleware – RFID information service

Unit – V

Manageability – Privacy and Security – The Future

Text book :

"Bill Glover, Himanshu Bhatt" , O'Reilly, RFID Essentials
Reference Book:
Dennis Brown, "RFID Implementation , Tata McGrawHill, New Delhi, 2006

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SEMESTER V

Core Course XXVI - *Software Project Management*

Unit I

Software Management Renaissance: Conventional Software Management-Evolution of Software Economics-Improving Software Economics-The Old Way and the New.

Unit II

A Software Management Project Management Process Framework: Life-Cycle Phases-Artifacts of the Process-Model-Based Software Architectures-Work Flows of the Process-Check Points of the Process.

Unit III

Software Management Disciplines: Iterative Process Planning-Project Organizations and Responsibilities-Process Automation.

Unit IV

Software Management Disciplines: Project Control and Process Instrumentation-Tailoring the Process.

Unit V

Risk Management: Introduction-Risk-Categories of risk-A framework for dealing with risk-Risk Identification-Risk assessment-Risk planning-Risk management-Evaluating risks to schedule-Applying the PERT technique-Monte Carlo simulation-Critical chain concepts.

Text Books:

1. Software Project Management, Walker Royce, Pearson Education, ISBN: 8177583786 Publishing Year: 2006
2. Software Project Management, Bob Hughes & Mike Cotterell, ISBN: 9780070619852 Pages: 384, Copyright Year: 2006
3. Software Project Management, Joel Henry, Pearson Education ISBN: 8131717925 Publishing Year: 2008

References:

1. Software Engineering, Roger S. Pressman, TMH Publications 2006 or later.

Note: Books are available in Amazon.com and Flipcart.com besides the bookstore

Core Course XXVII - NETWORK SECURITY

Unit I

Overview-Symmetric Ciphers: Classical Encryption Techniques

Unit II

Symmetric Ciphers: Block ciphers and the Data Encryption Standards Public-key Encryption and Hash Functions: Public-Key Cryptography and RSA

Unit III

Network Security Practices: Authentication applications-Electronic Mail Security

Unit IV

Network Security Practices: IP Security-Web Security

Unit V

System Security: Intruders-Malicious Software-Firewalls

Text Book:

1. William Stallings, Cryptography and Network Security-Principles and Practices, Prentice-Hall, Third edition, 2003 **ISBN:** 8178089025

References:

1. Johannes A. Buchaman , Introduction to cryptography, Springer-Verlag 2000.
2. Atul kahate , Cryptography and Network Security, Tata McGraw Hill. 2007

Note: Books are available in Amazon.com and Flipcart.com besides the bookstore.

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CORE COURSE XXVIII – COMPILER DESIGN

Unit I : Introduction

Compilers – Analysis of the source program – Phases of a compiler – Cousins of the Compiler – Grouping of Phases – Compiler construction tools – Lexical Analysis – Role of Lexical Analyzer – Input Buffering – Specification of Tokens

Unit II: Basic Data Structures

Role of the parser, Writing Grammars – Context – Free Grammars – Top Down parsing – Recursive Descent parsing – Predictive parsing – bottom –up parsing – shift Reduce Parsing – Operator Precedent Parsing – LR Parsers – SLR Parser – Canonical LR Parser – LALR Parser

Unit III: Advanced Data Structures

Intermediate Languages – Declarations – Assignment Statements – Boolean Expressions – Case Statements – Back patching – procedure calls

Unit IV: Sorting & Searching Techniques

Issues in the design of code generator – The target machine – Runtime Storage management – Basic Blocks and Flow Graphs – Next use Information – A simple Code generator – DAG representation of Basic Blocks – Peephole optimizaion

Unit V: Files

Introduction – Principal Sources of Optimization – Optimization of basic Blocks – Introduction to Global Data Flow Analysis – Runtime Environments – Source Language issues – Storage Organization – Storage Allocation strategies – Access to non-local names – Parameter Passing

Text Book(s)

1. Alfred Aho, Ravi Sethi, Jeffy D.Ullman, "Compilers – Principles, Techniques and Tools", Pearson Education Asia, 2003

References

1. Henk Alblas and Albert Nymeyer, "Practice and Principles of Compiler Building with C", PHI, 2001
2. Kenneth C. Louden, « Compiler Construction : Princip0les and Practices », Thompson Learning, 2003

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CORE COURSE XXIX – FRAME WORK LAB (RUBY & MEDIA LAB)

RUBY ON RAILS:

NOTE: LAB EXERCISES ARE NOT RESTRICTED TO THE LIST BELOW. BE ADVISED TO GENERATE MORE CREATIVE EXERCISES

1. Write a program to explain the class and object concept in Ruby.

2. Write a program for the following array operators

    1)array & other_array

    2) array * int [or] array * str

    3) array + other_array

    4) array . other_array

    5) array == other_array

1. Write a program to read the content in the file using file concepts in ruby.
2. Write a program to create a user defined function and how to call the function.
3. Write a program to
    1) Fetch the values from textbox and radio button
    2) Explain the session and cookies in rails.
4. Write a program to retrieve data from the database
5. Write a program for create Rails Controllers and Rails Views
6. Write a program to explain the concept of uploading files.

MULTIMEDIA LAB:

NOTE: LAB EXERCISES ARE NOT RESTRICTED TO THE LIST BELOW. BE ADVISED TO GENERATE MORE CREATIVE EXERCISES.

Recommended Tools: Photoshope, Flash, Maya, 3D Max etc

1. Create an e-Invitation for college day with audio note.
2. Create 30 second multi-media profile about your University Technology Park.
3. Animate a 5 yr child walking on the street.
4. Animate the same child stops when a vehicle crosses.
5. Generate a new comic character and give a name to it.
6. Create a video-resume about yourself.
7. Generate a voice that says the Alphabet when the key is pressed. If letter "A" is typed, your code should say "A".
8. Out of the box Thinking:

    Creatively think of any other multimedia application for blind or deaf people.

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CORE COURSE XXX - NETWORK SECURITY LAB

Recommended Tools: C, C# or J2SE 1.5 and above

NOTE: LAB EXERCISES ARE NOT RESTRICTED TO THE LIST BELOW. BE ADVISED TO GENERATE MORE CREATIVE EXERCISES.

SIMPLE NETWERK SPECIFIC EXERCISES:

1. Write a networking program in Java to implement a TCP server that provides services for a TCP Client.
2. Write a networking program to implement socket programming using User datagram Protocol in Java.
3. Implement an FTP server using socket programming.
4. Implement a chat server using socket programming.
5. Implement an ECHO server using socket programming.
6. Implement Address Resolution Protocol using socket programming.
7. Implement Ping server and Ping client using socket programming.
8. Implement Single Window Protocol.
9. Implement Remote Command Execution using network programming.
10. Using Remote Method Invocation distribute the processing to three nodes.
11. Implement a program to retrieve the data for the specified URL.
12. Write a Java program to check whether the given DNS is found in the internet or not.
13. Write a program to implement multicasting.
14. Write a network program using HTTP to print the document for the given URL.

SECURITY CENTRIC EXERCISES:

1. Write a program to convert your college name from plain text to cipher text using Transposition cipher method of encryption.
2. Write a program to convert your name from plain text to cipher text using the One Time Pads method of encryption.
3. Write a program to encrypt a paragraph using the Data Encryption Standard Algorithm.
4. Write a program to encrypt your biodata using the Advanced Encryption Standard Algorithm.
5. Write a program to decrypt the "Network Security" theory syllabus using the RSA Algorithm.

6.Write a program that takes a binary file as input and performs bit stuffing and Cyclic Redundancy Check Computation.

7.Write a program to Simulate the working of Sliding-Window protocol.

8.Write a program to find the shortest path in a network using Dijkstra's Algorithm.

9.Write a program to implement the Token Bucket Algorithm for Congestion Control.

10.Write a program for the following chat application.

One to One : Open a Socket connection and display what is written by one to another.

Many to Many : Each Client Opens a Socket connection to the client server and writes to the socket. Whatever is written by one can be seen by all.

11. Out of the box Thinking:

Can you secure a video or a movie from VCD piracy? How do protect video resources from copied?

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ELECTIVE COURSE IV – 1- GRID COMPUTING

Unit I

Introduction: Grid Computing & Key Issues – Applications – Other Approaches – Grid Computing Standards – Pragmatic Course of Investigation.

Unit II

Grid Benefits & Status of Technology: Motivations – History of Computing, Communications and Grid Computing – Grid Computing Prime Time – Suppliers and Vendors – Economic Value – Challenges.

Unit III

Components of Grid Computing Systems and Architectures: Basic Constituent Elements-A Functional View – A Physical View – Service View.

Unit IV

Grid Computing Standards-OGSI: Standardization – Architectural Constructs – Practical View – OGSA/OGSI Service Elements and Layered Model – More Detailed View.

Unit V

Standards Supporting Grid Computing-OGSA: Functionality Requirements – OGSA Service Taxonomy – Service Relationships – OGSA Services – Security Considerations.

Text Book(s)

1. A Networking Approach to Grid Computing, Daniel Minoli, Wiley Publication

References

1. Grid Computing – A Practical Guide to Technology and Applications, Ahmar Abbas, Charles River Media Publication.

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EC IV-2- SOFTWARE QUALITY ASSURANCE AND TESTING

Unit I

Principles of Testing – Software Development Life Cycle Models

Unit II

White Box Testing-Integration Testing-System and acceptance testing.

Unit III

Testing Fundamentals -2 & Specialized Testing: Performance Testing-Regression testing-Testing of Object Oriented Systems-Usability and Accessibility Testing.

Unit IV

Test Planning, Management, Execution and Reporting.

Unit V

Software Test Automation-Test Metrics and Measurements

Text Book(s)

1. Software Testing -Srinivasan Desikan, Gopalaswamy Ramesh, Pearson Education 2006.

References

1. Introducing Software testing-Louis Tamres, Addison Wesley Publications, First Edition.
2. Software testing, Ron Patten, SAMS Techmedia, Indian Edition 2001.
3. Software Quality-Producing Practical, Consistent Software-Mordechai Ben-Menachem, Gary S Marliss, Thomson Learning, 2003.

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ELECTIVE COURSE IV – 3- SOFT COMPUTING

Unit I

Artificial Neural Networks: Basic concepts - Single layer perception - Multilayer Perception - Supervised and Unsupervised learning – Back propagation networks - Kohnen's self organizing networks - Hopfield network.

Unit II

Fuzzy Systems: Fuzzy sets and Fuzzy reasoning - Fuzzy matrices - Fuzzy functions - Decomposition - Fuzzy automata and languages - Fuzzy control methods – Fuzzy decision making

Unit III

Neuro - Fuzzy Modeling: Adaptive networks based Fuzzy interface systems - Classification and Regression Trees - Data clustering algorithms - Rule based structure identification – Neuro - Fuzzy controls - Simulated annealing – Evolutionary computation

Unit IV

Genetic Algorithms - Survival of the Fittest - Fitness Computations - Cross over - Mutation - Reproduction - Rank method - Rank space method.

Unit V

SOFTCOMPUTING AND CONVENTIONAL AI: AI search algorithm - Predicate calculus - Rules of interference – Semantic networks - Frames - Objects - Hybrid models – Applications

Text Book(s)

1. Jang J.S.R., Sun C.T. and Mizutani E, "Neuro-Fuzzy and Soft computing", Prentice Hall 1998.

2. Timothy J.Ross, "Fuzzy Logic with Engineering Applications", McGraw Hill, 1997.

3. Laurene Fausett, "Fundamentals of Neural Networks", Prentice Hall, 1994.

4. D.E . Goldberg, "Genetic Algorithms: Search, Optimization and Machine Learning", Addison Wesley, N.Y, 1989.

ELECTIVE COURSE IV- 4 -PATTERN RECOGNITION

Unit I

Introduction and Bayerian Decision Theory-Introduction to pattern recognition, Systems, design cycles, learning and adoptation,Bayerian decision theory, minimum error-rate classification, classifiers, discriminant functions and decisions surfaces.

Unit II

Maximum – Likelihood and bayerian parameter estimation - Maximum – Likelihood estimation, bayerian estimation, bayerian parameter estimation, Guarian case and general theory, problems of dimeusability, Hidden marker models.

Unit III

Nonparameter Techniques - Density estimation, parazen windows, Kn – Nearest neighbour, estimation, The nearest neghlaur, rode, metris and nearest – neghron, classification, fuzzy classification, approximation by series expansions.

Unit IV

Linear Discriminant functions - Linear discriminant functions and decision surfaces, generadized linear discrminant functions, The two category unicorly separate case, minimizing the perception criterion function, relaxation procedures, nonrepersable behaviour, Minimum squared-error procedures, The Ho – Kashyap Procedures, support vexter machines, multicategory generatization.

Unit V

Multilayer Neural Networks - Feed forward operations and classifications, back propagation algorithm, error factors, back propagation as feature & mapping, back propagation, bayer theory and probability, practical techniques for improving back propagation, regularization, complexity adjustment and pruning.

Text / Reference Books:

1. Richard O. Duda, Peter E. Hart and David G. Stork, “Pattern Classification” 2nd Edition, John Wiley
2. John Hertz, Andres Krogh & Richard G. Palmer, “Introduction to the theory of Neural Computation”, Addison Wesley

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ELECTIVE COURSE IV – 5- ROBOTICS

Unit I

Fundamentals of robot Technology : Robot anatomy. Work volume. Drive systems. Control - Systems and dynamic performance - Accuracy and repeatability - Sensors in robotics – Robot reference frames and coordinates and robot kinematics.

Unit II

Robot kinematics : Matrix representation - Homogeneous transformations - Forward and inverse kinematics - Robot dynamics - Differential motions of a frame - Jacobian static force analysis.

Unit III

Configuration of a robot controller : End effectors - Mechanical and other types of grippers - Tools as end effectors - Robot and effector interface - Gripper selection and design - Introduction to robot languages.

Unit IV

Applications for manufacturing - Flexible automation - Robot cell layouts – Machine interference - Other considerations in work cell design - Work cell control – Interlocks – Robot cycle time analysis.

Unit V

Simulation of robotic work cells - Typical applications of robots in material transfer, machine loading/unloading; processing operations; assembly and inspection.

Text Book:

1.“Introduction to Robotics analysis, Systems & Applications” - Saeed B. Niku - Pearson Education Singapore P. Ltd., 2002.
2.“Robotic Technology and Flexible Automation” - S.R. Deb, Tata McGraw Hill Publishing Co. Ltd., 2003.
1.“Robotics & Control”- R.K. Mittal,I.J. Nagrath - Tata McGraw & Hill, 2005.

.References Book:

1."Fundamentals of Robotics, analysis & Control" Robert J. Schilling, Prentice Hall of India P.Ltd., 2002.

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ELECTIVE V - 1- Mobile Communications

Unit I

Introduction: Mobile and Wireless Devices – Simplified Reference Model – Need for Mobile Computing – Wireless Transmission – Multiplexing – Spread Spectrum and cellular systems – Medium Access Control – Comparisons

Unit II

Telecommunications System: Telecommunication System – GSM – Architecture – Sessions – Protocols – Hand over and Security – UMTS and IMT 2000 – Satellite System

Unit III

Wireless LAN : IEEE S02.11 – Hiper LAN – Bluetooth – MAC Layer – Security and Link Management.

Unit IV

Mobile IP: Goals – Packet Delivery – Strategies – Registration – Tunneling and Reverse Tunneling – Adhoc Networks – Routing Strategies

Unit V

WIRELESS APPLICATION PROTOCOL: Wireless Application Protocol (WAP) – Architecture – XML – WML Script – Applications

Text Book(s)

1. Jochen Schiller, "Mobile Communication", Pearson Education, Delhi, 2000.

References

1. "The Wireless Application Protocol: Writing Applications for the Mobile Internet", Sandeep Singhal, et al.

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ELECTIVE COURSE - V – 2- WEB SERVICES

Unit I

Introduction: What are web services? SOAP WSDL UDDI-Why Web Services are important? – The evolution of web applications Not just another distributed computing platform – Web services and enterprises.

Unit II

XML Fundamentals: The Lingua Franca of web services- XML Documents-XML namespaces Explicit and Default namespaces, Inheriting namespaces, And not inheriting namespaces, Attributes and namespaces -XML Schema XML schema and namespaces, A first schema, Implementing XML schema types, The any Element, Inheritance, Substitution groups, Global and local type declarations, Managing Schemas, Schemas and instance documents, XML schema best practices

Unit III

Overview of SOAP – HTTP – XML-RPC – SOAP: Protocol – Message Structure – Intermediaries – Actors – Design Patterns And Faults – SOAP With Attachments.

Unit IV

UDDI at a glance- The UDDI Business registry- UDDI under the covers – Accessing UDDI- How UDDI is playing out

Unit V

Conversations: Overview – Web Services – Web services Conversation Language – WSCL Interface components – The Bar scenario conversations – Relationship between WSCL and WSDL

Text Book(s)

1. Sandeep Chatterjee, James Webber, "Developing Enterprise Web Services", Pearson Education, 2004.

2. Frank. P. Coyle, XML, Web Services And The Data Revolution, Pearson Education, 2002.

3. Ramesh Nagappan , Robert Skoczylas and Rima Patel Sriganesh, " Developing Java Web Services", Wiley Publishing Inc., 2004.

4. McGovern, et al., "Java Web Services Architecture", Morgan Kaufmann Publishers,2005.

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ELECTIVE COURSE-V–3-MANAGEMENT INFORMATION SYSTEMS

Unit I

IT Foundation Concepts: Computer Hardware – Software – Data Resource Management – Telecommunication and Networks

Unit II

Is in Business Applications: Information systems and Technologies – Business applications, development and Management

Unit III

E-Business and E-Commerce: The e-Business enterprise – e-commerce – e-Business systems – e-Business decision support

Unit IV

Development process: Developing e-Business Strategies and Solutions

Unit V

Security and Ethics in E-Business: Security, social and Ethical Challenges in e-Business Enterprise and Global management of e-Business Real world cases Icongo, Yahoo, IBM,SAP, Oracle, Siebel, Wall Mart

Text Book

Management Information Systems, VI Edition, James A.O. Brien, Tata-McGraw Hill Edition

References

1. Management Information Systems, III Edition, Post and Anderson, Tata-McGraw Hill Edition
2. Frontiers of Electronic Commerce, Kalakota and Winston, Pearson Education
3. Information Technology for Management, VII Edition, Henry C. Lucas Jr.

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ELECTIVE V – 4 - COMPUTER GRAPHICS

UNIT-I

A survey of computer graphics – Overview of Graphic systems- output primitive (Mathematical functions for creating graphic output) – setting attribute of Output primitives

UNIT-II

Two dimensional geometric transformations – Two dimensional viewing

UNIT-III

Graphic structures – Hierarchical modeling – Graphical user interfaces and interactive input methods

UNIT-IV

3D Concepts – 3D- object Representation – 3D Geometric and Modeling Transformations.

UNIT-V

Visible surface detection methods – Illumination models – Computer Animation

TEXT BOOK:

1. Hearn Donald, Baker Paulin M., Computer graphics – C version**,** Second edition, Pearson education, 2006. (ISBN 81-7758-765-X)

REFERENCE BOOK:

1. Newman William M., & Sproull Robert F. , Principles of interactive computer graphics, Second edition, Tata –McGraw Hill, 1 (ISBN 0-07-463293-0)

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ELECTIVE - V – 5 – BUSINESS INTELLIGENCE

Unit I

Introduction to business intelligence and business decisions – Data warehouses and its role in Business Intelligence – Creating a corporate data warehouse – Data Warehousing architecture – OLAP vs. OLTP - ETL process – Tools for Data Warehousing – Data Mining – KDD Process

Unit II

Applications of Data Mining in Business – Data Mining Techniques for CRM – Text Mining in BI - Web Mining – Mining e-commerce data – Enterprise Information Management - Executive Information Systems

Unit III

Business Intelligence – Function, Process, Services & Tools - Application in different domains – Operational BI - Customizing BI – Managing BI projects vs. Traditional IS projects – Managing BI projects – Best Practices in BI Strategy

Unit IV

Knowledge Management – Definition – Data Vs. Information Vs. Knowledge – The ten key principle of KM – Knowledge Management Architecture – Knowledge Management Vs. Knowledge Processing – KM approaches – KM Tools – KM Infrastructure – KM models - KM Strategies

Unit V

Web Analytics and Business Intelligence – eCRM - Case Study: Web Trends – Boeing – EverBank – China Eastern

Text Book(s)

1. M.Raisinghani - Business Intelligence in the Digital Economy - Opportunities, Limitations and Risks, Idea Group publications, 2004.
2. Introduction to Data Mining and its Applications, Sumathy, Sivanandam, Springer Verlag, 2006
3. Knowledge Management and Business Innovation, Yogesh Malhotra, Idea Group, 2001.

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ELECTIVE -V – 6 – ONTOLOGIES AND SEMANTIC WEB

Unit I

Introduction to the Syntactic web and Semantic Web – Evolution of the Web – The visual and syntactic web – Levels of Semantics – Taxonomies - Logics for Semantic Web – The semantic web architecture and technologies – Applications of the Semantic Web.

Unit II

Ontological Engineering: What are Ontologies – Methods and methodologies for building ontologies – Ontology Development process and Life cycle – Methods for Ontology Learning – Ontology Evolution – Versioning – Ontology Languages.

Unit III

Editing tools for ontology creation – Protégé – OntoEdit – DOE – IsaViz – Ontolingua Altova Semantic Works – OilEd – WebODE – pOWL – Swoop.

Unit IV

The Key Semantic Web Ontology Languages – Semantic Reasoning – Logical Implications and Descriptions – Technical Interpretations of classes and predicates.

Unit V

Case Study: Resource Discovery In a Building – Reasoning about Knowledge Base and Ontologies – Semantic search Engines Based on Data Integration Systems.

Text Book(s)

1. Semantic Web Services – Theory, Tools and Applications, Jorge Cardoso, Information Science Reference, 2007

References

1. Agency and the Semantic Web, Christopher Walton, Oxford University Press, 2007
2. Semantic Web Technologies and e-Business, AF Salam and Jason R Stevens, Idea Group Publications, 2007